1.4

17. $\frac{3x+6}{5x^2} \cdot \frac{x}{x^2-4}$

$\frac{3x+2\cdot 3}{5x^2} \cdot \frac{x}{x^2-2^2}$

$3\left(\frac{3x}{3}+\frac{2\cdot 3}{3}\right) \cdot \frac{x}{(x-2)(x+2)}$

$\frac{3(x+2)}{5x^2} \cdot \frac{x}{(x-2)(x+2)}$

$\frac{3(x+2)x}{5x^2(x-2)(x+2)}$

$\frac{3}{5x^{2-1}(x-2)}$

$\frac{3}{5x(x-2)}$

19. $\frac{4x^2}{x^2-16} \cdot \frac{x^3-64}{2x} = \frac{4x^2}{x^2-2^4} \cdot \frac{x^3-2^6}{2x}$

$\frac{4x^2}{x^2-(2^2)^2} \cdot \frac{x^3-(2^2)^3}{2x} = \frac{4x^2}{(x-2^2)(x+2^2)} \cdot \frac{(x-2^2)(x^2+x\cdot 2^2+(2^2)^2)}{2x}$

$\frac{4x^2}{(x-4)(x+4)} \cdot \frac{(x-4)(x^2+4x+2^4)}{2}$

$\frac{4x^2}{(x-4)(x+4)} \cdot \frac{(x-4)(x^2+4x+16)}{2x} = \frac{4x^2(x-4)(x^2+4x+16)}{(x-4)(x+4)2x}$

$\frac{2x^{2-1}(x^2+4x+16)}{x+4} = \frac{2x(x^2+4x+16)}{x+4}$

21) $\frac{4x-8}{-3x} \cdot \frac{12}{12-6x} = \frac{-2^2 \cdot x - 2^3}{3x} \cdot \frac{12}{-6x+12}$

$\cdot \frac{2^2\left(\frac{2^2 \cdot x}{2^2} - \frac{2^3}{2^2}\right)}{3x} \cdot \frac{12}{-(2 \cdot 3)x + 2^2 \cdot 3}$

$\frac{2^2(x-(2^{3-2}))}{3x} \cdot \frac{12}{2 \cdot 3\left(\frac{-2 \cdot 3x}{2 \cdot 3} + \frac{2^2 \cdot 3}{2 \cdot 3}\right)}$

$\frac{-2^2(x-2)}{3x} \cdot \frac{2 \cdot 2 \cdot 3}{2 \cdot 3(x+2)}$

$\frac{-2^2(x-2)}{3x} \cdot \frac{2}{-x+2}$

$\frac{-2^2 \cdot 2(x-2)}{3x(-x+2} = \frac{2^{2+1}(x-2)}{3x(-x+2)} = \frac{2^3}{3x}$

23) $\frac{x^2-3x-10}{x^2+2x-35} \cdot \frac{x^2+4x-21}{x^2+9x+14} = \frac{x^2-5x+2x-10}{x^2-5x+7x-35} \cdot \frac{x^2-3x+7x-21}{x^2+2x+7x+14}$

$\frac{x(x^{2-1}-5)+2(x-5)}{x(x^{2-1}-5)+7(x-5)} \cdot \frac{x(x^{2-1}-3)+7(x-3)}{x(x^{2-1}+2)+7(x+2)}$

$\frac{(x-5)(x+2)}{(x-5)(x+7)} \cdot \frac{(x-3)(x+7)}{(x+2)(x+7)}$

$\frac{x+2}{x+7} \cdot \frac{x-3}{x+2} = \frac{(x+2)(x-3)}{(x+7)(x+2)}$

$\frac{x-3}{x+7}$

25. $\frac{6x}{x^2-4} = \frac{6x}{x^2-4} \cdot \frac{(3x+4)}{3x-9} = \frac{6x}{x^2-4} \cdot \frac{(3x+4)}{3x-9}$

$\frac{3x-9}{2x+4} = \frac{18x^2+24x}{3x^3-9x^2-4(3x-9)}$

$\frac{18x^2+24x}{3x^3-9x^2-12x+36}$

$\frac{2x^2+2x}{3x^3-x^2-x+36}$

27. $\frac{8x}{x^2-1} = \frac{x^2-1}{10x} \cdot \frac{(x+1)}{} = \frac{8x^2+8x}{10x^3+10x^2} = \frac{4x+4}{5x^2+5}$

$\frac{10^x}{+1}$

29. $\frac{4-x}{4+x} = \frac{-x^3+4x^2-16x+64}{4x-16x} = \frac{x^3+x+64}{}$

$\frac{4x}{x+16}$

31. $\frac{x^2+7x+12}{x^2-7x+12} = \frac{x^2+7x+12}{x^2-7x+12} \cdot \frac{(x^2-x-12)}{x^2+x-12}$

$\frac{x^2+x-12}{x^2-x-12}$

$= \frac{x^4+6x^3-7x^2-96x-144}{x^4-6x^3-7x^2+96x-144}$

33. $\frac{2x^2-x-28}{3x^2-x-2} \cdot \frac{4x^2+16x+7}{3x^2+11x+6} = \frac{2x^2-x-28}{3x^2-x-2} \cdot \frac{(3x^2+11x+6)}{4x^2+16x+7}$

$= \frac{6x^4+19x^3-83x^2-314x-168}{12x^4+44x^3-3x^2-39x-14}$

35. $\frac{x}{2} + \frac{5}{2} = \frac{x+5}{2}$

37. $\frac{x^2}{2x-3} - \frac{4}{2x-3} = \frac{x^2}{2x-3} - \frac{4}{2x-3}$

$\frac{x^2-4}{2x-3} = \frac{x^2-4}{2x-3}$

39. $\frac{x+1}{x-3} + \frac{2x-3}{x-3} = \frac{x^2}{2x-3} - \frac{4}{2x-3} = \frac{x^2-4}{2x-3}$

$\frac{x^2-4}{2x-3}$

41. $\frac{3x+5}{2x-1} - \frac{2x-4}{2x-1} = \frac{3x+5-(2x-4)}{2x-1} = \frac{x+9}{2x-1}$

43. $\frac{4}{x-2} + \frac{x}{2-x} = \frac{4}{x-2} + \frac{x}{2-x} = \frac{4+x}{x-2} = \frac{x-4}{-x+2}$

45. $\frac{4}{x-1} + \frac{2}{x+2} = \frac{(x+2)\cdot 4}{(x-1)(x+2)} + \frac{(x-1)\cdot 2}{(x-1)(x+2)} = \frac{6x+6}{x^2+x-2}$

47. $\frac{x}{x+1}$ +

49. $\frac{x-}{x+2}$

$= 2$

51. $\frac{x}{x^2-}$

53. x^2

57. 4

47. $\frac{x}{x+1} + \frac{2x-3}{x+1} = \frac{x+2x-3}{x+1} = \frac{3x-3}{x+1}$

49. $\frac{x-3}{x+2} - \frac{x+4}{x-2} = \frac{(x-2)(x-3)}{(x-2)(x+2)} + \frac{(x+2)(x+4)}{(x-2)(x+2)}$

$= \frac{2x^2+x+14}{x^2-4}$

51. $\frac{x}{x^2-4} + \frac{1}{x} = \frac{xx}{x(x^2-4)} + \frac{x^2-4}{x(x^2-4)} = \frac{2x^2-4}{x^3-4x}$

53. $x^2-4, x^2-x-2 \quad (x+1)(x+2)(x-2)$

$x^2-4 : (x+2)(x-2) = x^2-x-2 : (x+1)(x-2)$

$x^2-x-2 = (x^2+x)+(-2x-2)$

$x(x+1)-2(x+1) = (x+1)(x-2)$

$(x+1)\cdot(x+2)\cdot(x-2)$

57. $4x^3-4x^2+x, 2x^3-x^2, x^3$

$4x^3-4x^2+x : x(2x-1)^2$

$2x^3-x^2 : x^2(2x-1)$

$(2x-1)^2 \cdot x^3$

59. x^3-x, x^3-2x^2+x, x^3-1

$x^3-x : x(x+1)(x-1)$

$x^3-2x^2+x : x(x-1)^2$

$x^3-1 : (x-1)(x^2+x+1)$

$x\cdot(x+1)\cdot(x-1)^2\cdot(x^2+x+1)$

61. $\frac{x}{x^2-7x+6} - \frac{x}{x^2-2x-24}$ $x^2-7x-6, x^2-2x-24$ $(x-1)(x-6)(x+4)$

$\frac{x(x+4)}{(x-1)(x-6)(x+4)} - \frac{x(x-1)}{(x-1)(x-6)(x+4)}$

$= \frac{x(x+4) - x(x-1)}{(x-1)(x-6)(x+4)}$ $= x(x+4) - x(x-1) : 5x$

$= \frac{5x}{(x-1)(x-6)(x+4)}$

63. $\frac{x}{x^2-4} - \frac{2}{x^2+x-6}$ $= \frac{x(x+3)}{(x+2)(x-2)(x+3)} - \frac{2(x+2)}{(x+2)(x-3)(x+3)}$

$x(x-3) - 2(x+2)$ $= x(x+3) - 2(x+2) : x^2+x-4$

$(x+2)(x-2)(x-3$ $= \frac{x^2+x-4}{(x+2)(x-2)(x+3)}$

67. $\frac{x+4}{x^2-x-2} - \frac{x-4}{x^2-2x-8}$ $\frac{7x+10}{(x-1)(x-2)(x+2)}$

$\frac{x+4}{x^2-x-2} - \frac{1}{x+2}$ $= x^2-x-2, x+2 : (x+1)(x-2)(x+2)$

$\frac{(x+4)(x+2)}{(x+1)(x-2)(x+2)} - \frac{(x+1)(x-2)}{(x+1)(x-2)(x+2)}$

$\frac{(x+4)(x+2) - (x-1)(x-2)}{(x+1)(x-2)(x+2)}$

$(x+4)(x+2) - (x-1)(x-2) : 7x+10$

$\frac{7x+10}{(x+1)(x-2)(x+2)}$

69. $\frac{1}{x} - \frac{2}{x^2+x}$ x

$\frac{x(x+1)(}{x^2(x+1)(}$

$x(x+$

$x(x-$

$=$

71. $\frac{1}{h}\left(\frac{1}{x}\right.$

$\frac{1}{h}\left(\right.$

$=$

73. $1-$

1

69. $\frac{1}{x} - \frac{2}{x^2+x} + \frac{3}{x^3-x^2} : \frac{x^3-2x^2+4x+3}{x^2(x+1)(x-1)}$

$\frac{x(x+1)(x-1)}{x^2(x+1)(x-1)} - \frac{2x(x-1)}{x^2(x+1)(x-1)} + \frac{3(x+1)}{x^2(x+1)(x-1)}$

$\frac{x(x+1)(x-1) - 2x(x-1) + 3(x+1)}{x^2(x+1)(x-1)}$

$x(x-1)(x-1) - 2x(x-1) + 3(x+1) \quad x^3 - 2x^2 + 4x + 3$

$= \frac{x^3-2x^2+4x+3}{x^2(x+1)(x-1)}$

71. $\frac{1}{h}\left(\frac{1}{x+h} - \frac{1}{x}\right) = -\frac{1}{x(h+x)}$

$\frac{1}{h}\left(\frac{-h}{x(h+x)}\right) = \frac{1}{h} \cdot \frac{h}{x(h+x)}$

$= -\frac{1}{h} \cdot \frac{h}{x(h+x)} \quad = -\frac{1}{x(h+x)}$

73. $\frac{1+\frac{1}{x}}{1-\frac{1}{x}} = \frac{1+\frac{1}{x}}{\frac{x}{x}} : \frac{\frac{x+1}{x}}{\frac{x}{x}} = \frac{\frac{x+1}{x}}{1-\frac{1}{x}}$

$= \frac{(x-1)x}{x(x-1)}$

$= \frac{x+1}{x-1}$

75. $\dfrac{2-\frac{x+1}{x}}{\frac{3+x-1}{x+1}} \div \dfrac{(x-1)(x+1)}{x(4x-2)} = \dfrac{\frac{2x-x+1}{x}}{\frac{x-1}{x}} \div \dfrac{(x-1)(x+1)}{x(4x-2)}$

$= \dfrac{\frac{x-1}{x}}{\frac{3+x-1}{x+1}} \div \dfrac{(x-1)(x+1)}{x(4x-2)} = \dfrac{\frac{x-1}{x}}{\frac{4x+2}{x+1}} \div \dfrac{(x-1)(x+1)}{x(4x-2)}$

$= \dfrac{(x-1)(x+1)}{x(4x+2)}$

77. $\dfrac{\frac{x+4}{x-2}-\frac{x-3}{x+1}}{\frac{10x-2}{(x+1)^2(x-2)}} = \dfrac{\frac{x+4}{x-2}-\frac{x-3}{x+1}}{\frac{10x-2}{(x-2)(x+1)}} \div \dfrac{x+1}{1}$

$= \dfrac{10x-2}{(x-2)(x+1)(x+1)} \div (x+1)^2(x-2)$

$= \dfrac{10x-2}{(x+1)^2(x-2)}$

79. $\dfrac{\frac{x-2}{x+2}+\frac{x-1}{x+1}}{\frac{x}{x+1}-\frac{2x-3}{x}} \div \dfrac{(2x^2-4)x}{(x+2)(-x^2+x+3)} = \dfrac{x-2+x-1}{x+2} \div \dfrac{2x^2-4}{(x+2)(x+1)}$

$= \dfrac{2x^2-4}{(x+2)(x+1)} \div \dfrac{(2x^2-4)x(x+1)}{(x+2)(x+1)(-x^2+x+3)}$

$\dfrac{x+1}{x}-\dfrac{2x-3}{x} = \dfrac{(2x^2-4)x}{(x-2)(-x^2+x+3)}$

81. $1-\dfrac{1}{1-\frac{1}{1-}}$

88. $\dfrac{2(x-}{3(x-}$

$3($

$=($

85. $(2$

81. $\dfrac{1-\dfrac{1}{1-\dfrac{1}{1-x}}}{x} = \dfrac{1+\dfrac{1-x}{x}}{\dfrac{1}{1-\dfrac{1}{1-x}}} = \dfrac{\dfrac{1-x}{x}}{\dfrac{1}{1-x}} = 1-\left(\dfrac{-x+1}{x}\right)$

$= 1+\dfrac{1-x}{x}$

83. $\dfrac{2(x-1)^{-1}+3}{3(x-1)^{-1}+2} : \dfrac{3x-1}{2x+1} = 2(x-1)^{-1}+3 : \dfrac{3x-1}{x-1}$

$3(x-1)^{-1}+2 : \dfrac{2x+1}{x-1} = \dfrac{3x-1}{\dfrac{x-1}{2x-1}}$

$= \dfrac{(3x-1)(x-1)-3x-1}{(x-1)(2x+1)\ 2x+1}$

85. $\dfrac{(2x+3)\cdot 3-(3x-5)\cdot 2}{(3x-5)^2} = 3(2x+3) : 6x+9$

$= \dfrac{6x+9-2(3x-5)}{(3x-5)^2}$

$-2(3x-5) : -6x+10$

$= \dfrac{6x+9-6x+10}{(3x-5)^2}$

$6x+9-6x+10 : 19$

$= \dfrac{19}{(3x-5)^2}$

87. $\frac{(2x+3)\cdot 3-(3x-5)\cdot 2}{(3x-5)^2} : \frac{19}{(3x-5)^2}$

$= \frac{3(2x+3)-2(3x-5)}{(3x-5)^2} = 3(2x+3) : 6x+9$

$= \frac{6x9-2(3x-5)}{(3x-5)^2} = -2(3x-5) : -6x+10$

$= \frac{6x+9-6x+10}{(3x-5)^2} = \frac{6x9-6x+10}{(3x-5)^2} : -6x+10$

$= \frac{6x+9-6x+10}{(3x-5)^2} = 6x+9-6x+10 : 19$

$= \frac{19}{(3x-5)^2}$

89. $\frac{(3x+1)\cdot 2x-2x-x^2\cdot 3}{(3x+1)^2} = \frac{(3x+1)\cdot 2x-x^2\cdot 0.3}{(x^2+1)^2} = \frac{5.7x^2+2x}{(x^2+1)^2}$

$\frac{(3x1)\cdot 2x-x^2\cdot 0.3}{(x^2+1)^2} = (3x+1\cdot 2x-x^2\cdot 0.3\cdot 5.7x+$

$\frac{}{(x^2+1)^2} = \frac{5.7x^2+2x}{(x^2+1)^2}$

91. $\frac{(x^2+1)\cdot 3-(3x+4)\cdot 2x}{(x^2+1)^2}$

$\frac{(x^2+1)\cdot 3-(3x+4)\cdot 0.2x}{(x^2+1)^2}$

$(x^2+1)\cdot 3-(3x+4)\cdot 0.2x : 2.4x^2-0.8x+3$

$= \frac{2.4x^2-0.8x+3}{(x^2+1)^2}$